FARM REPORT

MINER INSTITUTE
RESEARCH EDUCATION DEMONSTRATION
CHAZY, NY

In This Issue:

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FROM THE PRESIDENT'S DESK: IT'S COLD OUTSIDE!

The first week of January I received an email from a long-time nutritionist friend suggesting an article on cold stress in dairy cows for our January Farm Report. He concluded by saying that he hates walking on frozen manure – and I couldn't agree more. Our January issue was already set to print when I received his email, and so, here it is in February. It may not be as painfully cold when you read this article as it was when I wrote it in January, but my guess is that it will still be plenty chilly throughout the Northeast and Midwest!

Cows adapt pretty well to a variety of temperatures, and surprisingly little research has actually focused on cold stress whereas there's a mountain of information for heat stress abatement. The upper critical temperature-humidity index has been established around 68 or so for lactating cows, and we all know cooling needs to start or else cows will lose resting, rumination, and milk yield.

But there's no consensus for a lower critical temperature, below which you would observe effects of cold stress that might eventually curtail milk production. Research in the past few decades indicates that the lower critical point for sheltered cows may fall somewhere between freezing and zero degrees F. But many factors affect when cows feel cold stress such as degree of winter hair coat and air movement through the barn.

It's rare to find research on cold stress for housed dairy cattle, but recently a European research group assessed cold stress in free stall barns and its influence on milk yield (Czech. J. Anim. Sci. 2015. 60:81-87). These researchers found substantial variation, or microenvironments, within the free stall barn. Temperature varied by up to 9˚F and wind velocity by 1.6 ft/sec depending on location. You can have considerable variability in temperature conditions within a barn, even wind chill in some locations. In this study, regions of the barn with average temperatures of 12˚F or less resulted in about 4.5 lb/day less milk production. Additionally, higher producing cows seemed more vulnerable to cold stress than lower producing cows.

In general this paper concluded that in free stall barns cold stress to the point of reducing milk yield occurred primarily at temperatures lower than freezing. The worst cold stress conditions were found by sidewalls with curtains, especially if they were poorly maintained. This point seems obvious, but it's common to walk into barns and see curtains that need to be fixed or doors that don't close properly. When housed in well maintained barns, dairy cows tend to tolerate cold and even

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A FARM?? IN CHICAGO?? HOW I GOT MY START IN AGRICULTURE

Agricultural education is something that I was fortunate enough to learn in high school and throughout my college years. My high school, Chicago High School for Agricultural Sciences, has been around for nearly 30 years and is one of the best-kept secrets in Chicago. The curriculum isn't that different than what you would find in any other high school, with classes in math, science, English, and the arts. Electives are where it stands out. Instead of having classes such as psychology or economics we had classes that focused on agriculture. The agricultural classes offered are called "pathways", comparable to having a major in college. Freshmen take a basic agricultural leadership and agricultural sciences class, where students learn about the industry, FFA, and how important agriculture is to our society. During the sophomore year, students begin rotating through each pathway to get an idea of the class setup and what will be taught. At the end of the sophomore year, students choose their pathway to focus on during the junior and senior years. When I attended the high school there were 5 agricultural pathways: food science, animal science, horticulture, mechanical technology, and agricultural finance.

Since I was a student there they have added an agricultural education pathway for students interested in teaching agriculture. Students go to each class to get a taste of what will be learned in every aspect. This high school also has a unique aspect of the education it has to offer since it is built on a farm, the last farm in the city of Chicago. This allows students to apply what they learn in the classroom, such as tending to the different animals in the barn, maintaining the golf course the students designed and executed, planting and harvesting crops, running the farm stand that's open to the public and much more. The animal science pathway is taught by a veterinarian, horticulture by a landscape architect, the mechanical technology teacher was a licensed architect, and so on. Each student enrolled in this school takes an agricultural class and is automatically an FFA member, making this high school one of the largest chapters in the U.S. at about 720 members.

This high school sparked my passion for agriculture, as it has for the many other students who have moved on to careers in the ag industry. Over the years more and more schools are starting to include agriculture in their curriculums and there are even other agricultural high schools in the United States including in Minnesota, Massachusetts and Mississippi. Even in Chicago there are more schools offering urban agriculture and agricultural science classes. What does this mean for the future of the industry? I like to think of these high schools as bridges for producers and consumers, something that is so needed nowadays. These schools are taking kids from urban areas teaching them about where and how the food gets on their plates and educating them on the ways of the industry. These kids then become "agvocates" becoming passionate and bringing something different to the table. They begin to talk to their parents, friends, and family about the truths about the industry. They help to spread awareness and in doing so help to get the message out. Education is one of the most powerful tools we can equip these students with and these schools and programs are expanding the typical educational aspects for these kids. Who knows, maybe agricultural will be in every high school in the next 10 years.

— Katie McMahon
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PHOSPHORUS LOSS AND TILE DRAINS

Phosphorus (P) loss from cropland is a concern in the Lake Champlain Basin and many other watersheds both in the U.S. and globally. Crops need adequate P for optimal performance and yield, however excess P lost to runoff can contribute to eutrophication of freshwater. Unlike nitrogen (N), P reacts readily with soil constituents (i.e, Al, Ca, Fe, clays) and is generally tightly bound. As such, P loss from crop fields is often associated with soil erosion and surface water runoff. With the exception of soils that have received large amounts of manure or fertilizer applications, only a very small fraction of total soil P is available for plant growth.

Where soil P levels are elevated due to historical P applications, P is more soluble and more easily lost to runoff water. While this is advantageous for crop growth, if this runoff water enters ditches or surface waters it may contribute to water quality deterioration. Practices that keep more soil and P on fields are thus mutually beneficial for agricultural production and water quality.

While wastewater treatment plants, urban/residential areas, and forests all contribute P to Lake Champlain, agriculture is considered to contribute 38% of the total P load. Recent policy changes in Vermont have increased the focus on controlling P losses from the agricultural sector. As part of this effort, the idea of regulating tile drains as a "point source" of P has been considered.

The objective of tile drains is to lower the seasonally high water table in poorly drained fields to create more favorable growing conditions. While there are many agronomic benefits of tile drains (higher yield potential, lower compaction potential, warmer soils), there are also soil conservation and water quality benefits. In fact, USDA previously promoted tile drainage to reduce erosion losses and facilitate other conservation practices such as no-till.

Tile drains have been under increased scrutiny recently due to the potential for N and P transport in tile flow. Due to their much different behavior chemically, N is more vulnerable to leaching and movement in tile drain flow. While some degree of P leaching to tile drains can occur, it greatly depends on several variables including field hydrology (i.e., amount of runoff leaving in surface runoff or tile drainage) soil texture, soil P levels, manure management, and tile depth. Two years of monitoring tile drain flow and surface runoff at one of our research sites has shown that over 90% of total and soluble reactive P loss was due to surface runoff, despite the majority of runoff being from tile drains.

Other studies have shown that P losses from tile drains can account for a larger fraction of P loss. For example, some studies in the Midwest have shown that over 50% of total P loss can occur via tile drain flow. These fields tend to be large, flat fields with little slope and therefore generate lower amounts of surface runoff. Our soils and landscapes in the Northeast are more topographically diverse with variable drainage, and tend to generate substantial amounts of surface water runoff, particularly during the non-growing season.

Few field studies have been conducted in NY or VT with the specific objective of comparing P export in tile drainage and surface runoff from the same field or similar fields. More research is needed to quantify P and N loss differences between tile-drained and undrained fields to better understand how hydrology and management impact losses, and to evaluate different best management practices that can mitigate losses.

Research has shown that tile drains can decrease erosion/total P loss. In addition, we know that in most cases P loss from crop fields is dominated by surface water runoff. Given this and the fact that there's a clear lack of field-based research systematically addressing P loss from both tile-drained and undrained fields, regulating tiles would not be based on the best available science. Our fields in the Northeast are different than those in the Midwest or Canada, and more studies are warranted to better understand potential water quality tradeoffs associated with tile-drained fields. We know that nutrient management practices based on field studies are the best way to minimize nutrient losses to runoff water, whether surface runoff or tile drainage.

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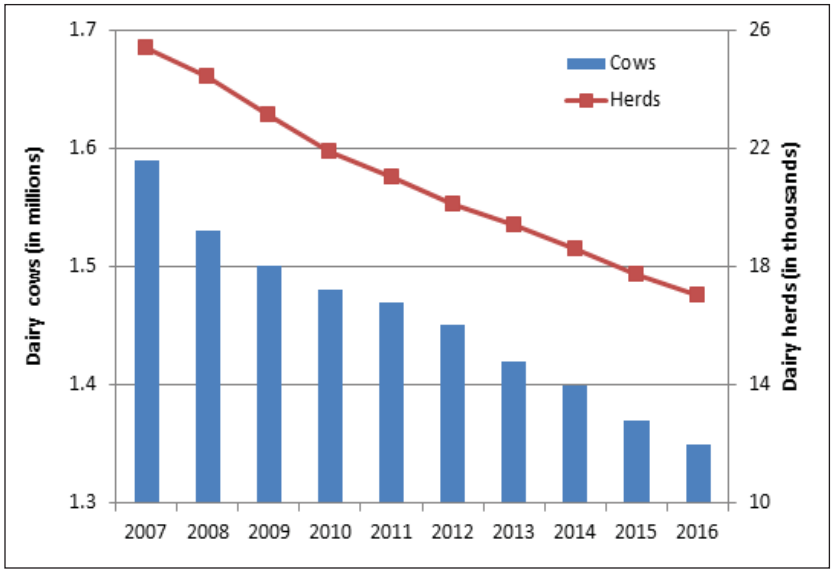
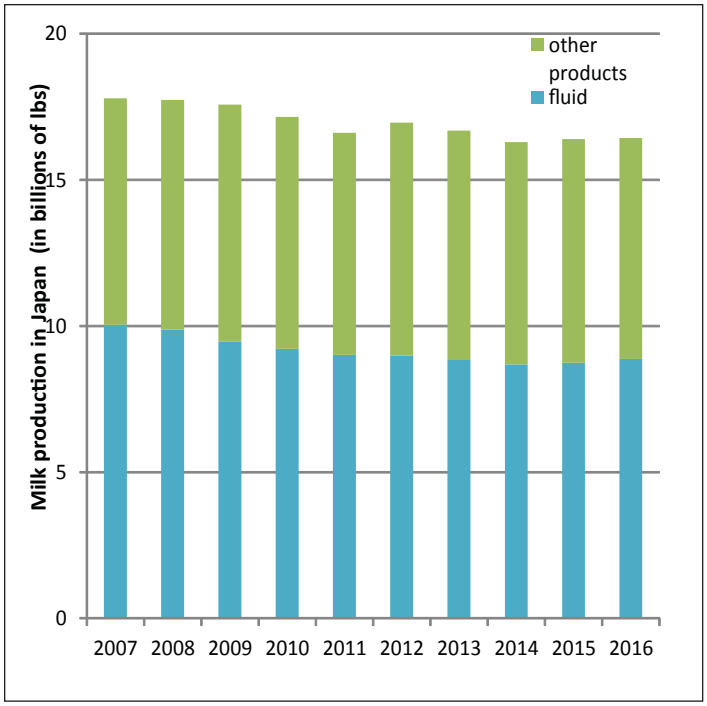
DAIRY INDUSTRY IN JAPAN

I have been working for Zen-Noh, a Japanese agricultural cooperative and have been stationed at Miner Institute as a Zen-Noh representative for almost two years. Miner Institute and Zen-Noh have had a collaborative relationship for over 20 years to conduct various studies together. I'm happy to have an opportunity to introduce the Japanese dairy industry in the *Farm Report*.



The dairy industry in Japan is much smaller than that in the U.S. We have 1.3 million cows, 17,000 herds (9.3 million cows, 42,000 herds in the U.S.). Almost all dairy cows in Japan are Holsteins. The average herd size is less than 80 cows/herd, which is about one third of the average U.S. herd size. Annual milk production is about 16 billion lbs (more than 200 billion lbs in the U.S.), and half is processed for fluid milk.



Japan is a small country and has a lot of mountains including volcanoes (that's why earthquakes often happen). So many Japanese farmers, especially in Honshu, the main island of Japan, are not able to have enough farm land to grow their own forages. Those farmers have to purchase their feeds from others. We would say that the U.S. feed Japanese cows because most of the grains and forages are imported from the U.S. However, it means that feed costs are higher and more fluctuated in Japan. Although the milk price is higher (about $40/cwt), it is not always reasonable for the feed cost.

Cost of replacement heifers has become another big issue in Japan. Farmers who have no space to keep their replacements usually buy heifers from Hokkaido, a northern island which is the primary dairy region in Japan. Now the price is about $7,000 per pregnant heifer! It's a huge investment! In fact, Wagyu, Japanese black beef cattle which produce wonderfully tender meat with high marbling affects the dairy heifer market. The price of Wagyu calves has also been inflated because of decreased calf production from Wagyu cow-calf operations. Now the price of Wagyu calves, both steers and heifers, is about $7,000 at 10 months old! Farmers could sell dairy heifers at almost the same price but have to keep them for 18-20 months. And how about dairy bulls? They are much cheaper than heifers, Wagyus or even crossbred calves (Wagyu × Holstein). If you were a Japanese dairy farmer, which would you like to breed? Yes, many farmers have been shifting to breeding Wagyu (either insemination or embryo transfer) to their dairy cows. That's why dairy replacement heifers are also getting expensive.

Unfortunately the numbers of dairy cows and herds in Japan are decreasing. In addition to the problems I wrote above, labor shortage is making the dairy industry difficult. A national survey in 2014 has indicated that 40% of Japanese dairy farmers had no successors. So we have focused efforts on improving labor efficiency as well as cow productivity and longevity. Some new technologies would be helpful for labor saving. Good management in every single aspect of dairy farming is also important to keep cows healthy and productive as mentioned in many articles in the *Farm Report*. Those efforts should be made not only for the present farmers but also for the next generations. I hope the relationship between Miner and Zen-Noh can brighten the future of dairy industry in Japan as well as in the U.S.

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BRIDGING THE TRUST GAP BETWEEN CONSUMERS AND PRODUCERS

— Source: The Center for Food Integrity

In general today's food system is safer, more sustainable, and more affordable than ever before, and yet consumer skepticism is at an all-time high according to The Center for Food Integrity (CFI). This disconnect is likely because the average consumer today is more than two generations removed from a farm. For the past decade CFI has performed annual research to understand the minds of today's consumers when it comes to food. Their most recent research findings, from the 2017 study conducted in August, have highlighted a large trust deficit between dairy food producers and consumers that has heightened consumer skepticism and has made it very clear that consumers need to be more engaged in the dairy food production process.

It's important for farmers to recognize and embrace the skeptical nature of consumers, because this means that consumers care and that they want to learn more. The research done by CFI found that nearly two-thirds of consumers are interested in knowing more about food production, and they will actively seek out that information. This provides farmers with the opportunity to enhance consumer engagement, engage in conversations, and earn consumer trust. So how do we gain the trust of our consumers? It's not enough to inform and educate consumers with scientific facts. Emotions drive the decision-making process, so an emotional connection is necessary. Consumers need to feel as though their concerns are being heard and shared by food producers. CFI reports that feeling as though they share values with farmers is three to five times more important to a consumer than scientific facts in the trust building process.

Perhaps the most effective strategy in gaining trust is to increase transparency regarding dairy food production. It's unfortunate that, according to CFI, only 25% of consumers believe that U.S. meat is derived from humanely treated animals when 95% of consumers agree that they would have no problem consuming meat, milk, and eggs if farm animals were treated decently and humanely. In addition, only 30% of consumers strongly agree that farmers take good care of the environment, which is especially concerning since 80% of consumers report that they are more worried about climate change than they were a year ago. As farmers and people who work very closely with farmers, we know how much of a priority animal husbandry and environmental sustainability is. However, it's that average consumer, who is at least two generations separated from the farm, that needs to be assured.

There are a number of ways to increase transparency, but since 39% of consumers strongly agree that online information shapes their opinions, CFI predicts that an online presence is among the most effective strategies. By posting photos or videos with explanations of animal welfare, the implementation of environmentally sound practices, and stories from the farm, consumers feel engaged on a personal level. This can be done through a social media presence or via a dedicated website for your particular farm. Although it requires more time and effort, inviting the public onto your farm is another way to not only generate transparency, but allow consumers to gain a new appreciation for the hard work and dedication that goes into creating their food.

A reality that farmers and food companies alike must accept is that consumers gather information from a variety of sources that the consumers feel like they share values with, and they synthesize that information to form their own opinion on the subject. The information must be coming from a trustworthy source for consumers to actually believe in it. Farmers must become an ally with consumers, by showing that their values match, and this will allow consumers to feel as though farmers are a trustworthy and reliable resource for gathering information.

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BLUE ANGELS AND LONG GREEN

I've written about this before but we're always getting new Farm Report subscribers so it seems worth repeating. Fifty years ago, Harvestore salesmen were out and about trying to sell "blue angels" to farmers. Their sales pitch was that with proper management the silo would pay for itself. The key words here are "proper management". The better Harvestore sales reps would diligently follow up with their proud new owners with something like this: "You now have the best silo storage system there is, but to make the best use of it you have to manage your forages properly and harvest them on time." And Harvestore was serious about this — in fact, for a while the company sold its own brand of alfalfa seed, apparently because it didn't approve of the varieties its clients were using.

The sales reps often encouraged their clients to make significant changes in crop management, particularly for hay crop silages. And at least some Harvestore owners followed these recommendations and improved forage quality (and therefore milk production) enough to make the purchase decision a profitable one. With the same improvements in their forage management would the farmers have made even more profit while using a concrete stave or bunker silo? Perhaps, but they had not done so before the Harvestore dealer darkened their door. That's why as a regional Extension Field Crop Specialist I got along well with most of these sales reps; our methods differed but the objective was similar — more profitability through better forage management.

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ON THE ROAD AGAIN

This is the busiest winter for speaking at farmer meetings that I've had in quite a few years. Unfortunately, all my business trips are north of our winter quarters in Virginia: Wisconsin, New York, Minnesota and Iowa. But that's where the cows are, so… We can get an idea of what the current hot topics are by what the sponsors of these meetings ask me to talk about. This year it includes reduced-lignin alfalfa, BMR corn, winter cereals, grass and alfalfa-grass — but as usual the focus is on forage quality.

Another way to tell what's hot is by the questions I'm asked, usually on-line, by farmers and agribusiness professionals. Recent questions include installing asphalt floors in bunker silos, how to use some of the newer forage quality assays, the importance of kernel texture in corn silage, and what's a sufficient level of lactic acid in silage. These questions are helpful in deciding what to write about in the *Farm Report.* And as always, your suggestions are welcomed.

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COLD, Continued from Page 1

high air movement as long as they are dry. Also, cows bounce back quickly from cold stress when protected from strong winds.

Practically, the primary challenges with prolonged cold stress often include water and freezing that limit access and may make for slippery floors; frozen manure on the floor that accumulates; poor stall bed quality (i.e., if there is frozen, chunky bedding or sand, remove it; double down on keeping stall beds clean and dry); frozen chunks of silage and other moist feeds in the TMR; and keeping adequate air movement within the barn. Although I haven't focused on it, teat health is critical; the National Mastitis Council web site has excellent information on keeping teat ends healthy during severe cold.

Remember, mature cows will withstand cold stress well if they're kept dry and out of the wind or strong drafts. But, prolonged cold stress freezes manure, water and pipes – and frays our patience. So, even as you're freezing, remember the strong link between gentle animal handling and productivity! Stay warm!

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Is there something you would like to know more about?

Send *Farm Report* article suggestions to Rachel at dutil@whminer.com

A FORAGE RESOLUTION

Some of you may have started 2018 with a New Year's resolution to start working out on a regular basis or spending more time doing a particular task. I'd like to propose a different New Year's resolution, focused on improving forage quality. We often discuss improving forage quality after there are 1000 tons of poor quality hay crop silage packed into a bunk; I'd like to start the conversation before that happens.

The first step should be to determine the bottlenecks. What's holding your dairy back from harvesting higher quality forages? Is it a piece of equipment that's lacking? Is your harvesting team understaffed? Would adding another seasonal employee allow you or another individual to work on a task that's being overlooked? Is the farm in need of more storage for the harvested crop? Would adding an extra bunk or bag allow you to strategically harvest and store feedstuffs that may be more suitable for a certain pen of cows? The low production cow group may not need the rocket fuel haylage that the high production group would. Is it currently possible to divide up the forage sources to better meet the needs of the cows?

Each dairy will have its own bottleneck and in turn their own solution. After determining which to address, formulate a game plan on how to eliminate the obstacle. Will the fix require a short or long term investment? With current milk future prices it may be difficult to justify purchasing a large new piece of machinery. Is there a short-term solution that may be more affordable and help get you a step in the right direction? Keep in mind that farm business data shows that farms that have forage systems that allow high quality forage to be harvested regardless of the growing season weather are often times the most profitable dairies.

After determining what action to take, talk with your team and see that the change occurs. It will take time and patience but it can be done. Don't let this resolution collect dust like that gym membership from January.

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LIVING WITH ALEXA

I bought The Bride an Echo Dot for Christmas; you know, one of those little gizmos wirelessly connected to the internet. It's obvious that Alexa, the voice of the Dot, is a female (albeit a virtual one). There's her lady-like voice of course, but there are several other ways that confirm her gender, and perhaps her marital status:

- Tucked into a corner of the kitchen counter, Alexa is listening carefully and responds when her name is mentioned even when it's just in passing, and two rooms away. Talk about elephant ears…
- When I asked her to notify me at 3:00 she first asked if that was AM or PM, and then wanted to know what it was about. Alexa is just a bit nosy…
- And when Alexa does notify me, once isn't good enough — she feels it necessary to remind me. Somewhere out there Alexa must have a husband.

— *E.T.*

* For a very funny SNL video on the Amazon Dot:https://www.youtube.com/watch?time_continue=1&v=YvT_gqs5ETk

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NOBODY ASKED MY OPINION, BUT..

… the last time The Bride made breakfast for me was late in the previous millennium. I'm usually up by about 6 AM, while T.B. makes an appearance somewhat later than that. She said that she married me for better or worse, but not for breakfast.

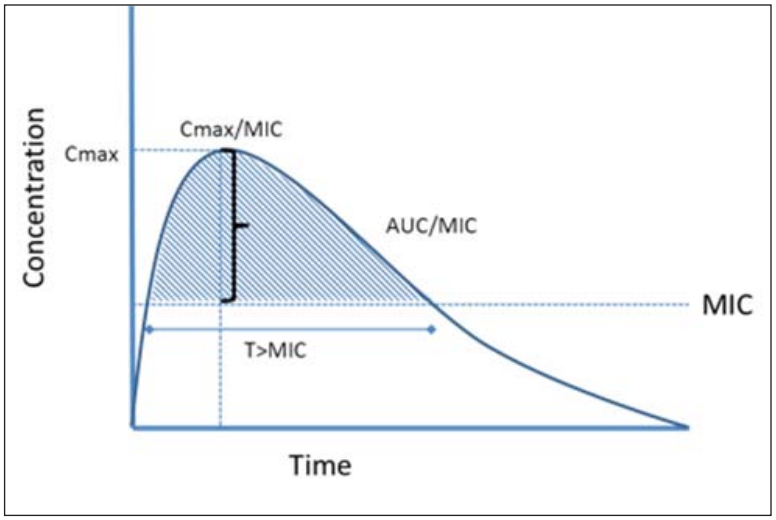
…why do drug stores make sick people walk all the way to the back of the store to pick up prescriptions while healthy people can buy cigarettes at the front?

…I'll never understand why a woman can't apply mascara with her mouth closed.

— *E.T.*

HOW DISEASE IMPACTS CALVES & MAKING SURE TREATMENT IS EFFECTIVE

In early December I along with Bethann Buskey, our Calf Supervisor, I attended Cornell Cooperative Extension's annual "Calf and Heifer Congress" in East Syracuse, NY. The theme of the Congress was "Rising Above the Challenges." In an industry where milk price is usually the biggest challenge we worry about, we often overlook the fact that raising calves can sometimes be a real struggle. In bringing up the next generation of the milking herd, as producers it sometimes seems like an uphill battle with starting calves on the right foot so that they grow up to be healthy, productive animals. That's not always an easy thing to do when calves get sick. Danielle Mzyk North Carolina State University, discussed how disease impacts calves and how antibiotics work, as well as how to evaluate the efficacy of treatment.



The age of cattle significantly impacts body composition, immunology, physiology, and disease. Calves are physiologically different than cows, with a lower percentage of body fat and more extracellular water. Their immune system is undeveloped and they have lower neutrophil (white blood cell) function. The rumen is not developed yet, nor are all the metabolic pathways. Lastly, they are affected by different pathogens that cause disease and the ways that they are affected are different than mature cows.

Pharmacokinetics is a fancy way of saying what the body does to a drug. We give a drug, it gets absorbed, reaches a maximum concentration at a certain time, gets distributed, metabolized, and excreted. This can change based on the physiology of the calf and how the drug is given.

Disease can either increase or decrease the absorption of drugs, but very young calves usually have higher absorption because they have no developed rumen to break down the drug. Most absorption will occur through the enteral (intestinal) route. When a drug is ingested it will usually bypass the rumen and get absorbed in the abomasum and intestines. A lot of things affect enteral absorption, but some drugs will bind to milk proteins and won't get absorbed, so you should consult your herd veterinarian if questioning mixing a calf's drugs in her milk. Parenteral absorption happens when the calf is given drugs via subcutaneous or intramuscular injection. Hydration status greatly affects this process. If a calf is dehydrated there will be less blood flow to the site of the injection, therefore the drug will not be able to effectively and quickly get into the bloodstream to get distributed around the body. It's a good idea to get a calf to a good hydration status with some Ringers before treating so whatever drug you are using is more effective.

Because calves have more extracellular water in their bodies, distribution of lipophilic (fat-loving) drugs decreases, while distribution of hydrophilic (water-loving) drugs increases. This is because the hydrophilic drugs have plenty of water to bind to and get carried around.

Drugs also get distributed by binding to plasma proteins. This process can be affected by pathophysiological factors (the way the body changes when it's diseased) or endogenous compounds that can alter the drug-protein binding interaction.

In calves the liver both metabolizes and plays a role in eliminating drugs, while the kidneys eliminate drugs based on glomerular filtration, tubular secretion, and reabsorption. As a cow ages she has a higher glomerular filtration rate (GFR) because she has a greater cardiac output and therefore renal blood and renal plasma flow. This means that young calves have a low GFR.

Certain considerations must be made when clinical disease symptoms affect drug use. The importance of rehydrating a dehydrated calf before treating her has already been mentioned. Another state of disease is sepsis/endotoxemia. This is when bacteria and/or their toxins infect the bloodstream. This affects the volume of distribution, and absorption. In this state the blood is directed only towards the vital organs, decreasing the absorption from subcutaneous and intramuscular injection, as well as the oral route. It also affects clearance of drugs from the body because the kidneys don't work properly, so be aware of drug residues in this case.

Although it may sometimes be frustrating to deal with sick calves that are not responding to treatment, we can use what we know in terms of how their bodies work and how drug use is affected by their physical condition to make sure we are treating them effectively.

— Victoria Vendetta
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NOW ACCEPTING APPLICATIONS FOR A YEAR-LONG DAIRY INTERNSHIP

We are now accepting applications for our next dairy management intern – a fantastic opportunity for a motivated college graduate who is looking for hands-on experience in dairy management. This year-long internship is a herdsman training program that is tailored to each intern and their career goals. The intern works closely with the herdsman and farm manager, but also works with the other farm employees as well – feeders, calf manager, milkers. Jobs include assisting with calving, fresh cow care, vaccination, heat detection and reproductive management, diagnosing and treating sick animals and using management software including Dairy Comp 305 and the SCR health and detection system. The intern will work with our herd veterinarian and nutritionist and will gain experience in labor management on the farm. There are many different learning and networking opportunities throughout the year - guest speakers and classes at the Institute and regional conferences.

Applicants should have at least some dairy experience, be motivated and show an ability to work hard and cooperate with others. It is important the intern be eager to learn, able to follow instructions and use good judgment and be fluent in English. The valuable on-farm experience and dairy management skills acquired through this internship makes it an ideal transition between college and a career in the dairy industry. Our previous interns are all working in the dairy industry, in different capacities – several are herdsmen, one is now a veterinarian, and another went on for her Master's Degree and became a dairy nutritionist in Wisconsin.

Miner Institute is an equal opportunity employer. In accordance with federal and state law, all applicants will be considered without regard to race, color, religion, sex, age, marital status, national origin, disability, military status, domestic violence victim status, predisposing genetic characteristics, sexual orientation or any other basis protected by law.

The internship is a paid position and housing is provided in our student complex. If you have questions or would like to apply for the position, please send your resume and a letter (outlining your career goals and how this internship would be mutually beneficial to our farm and to you) to Steve Couture at couture@whminer.com. We will be accepting applications until we find the right person, though we hope to have a new intern in place by May or June 2018.

REASONS TO BE HAPPY

Yeah, milk prices may be in the toilet, Congress is giving new meaning to the term "dysfunctional", and there's no woodchuck in the North Country dumb enough to poke his head out of his burrow to look for its shadow, but there are still some reasons for farmers to be happy.

- The biocontrol nematodes originally intended by Cornell University entomologist Elson Shields and staff to control alfalfa snout beetle are showing promise in controlling soil-born insects in other crops including rootworms in field corn. A Texas trial on land with severe corn rootworm pressure found Western corn rootworm larval feeding reduced by two-thirds a full year before any positive results were expected. Even greater levels of control may occur as nematode populations increase, because once established it appears that the nematodes remain in the soil.
- In a technique originally developed to combat mosquito-borne diseases, scientists are now experimenting with genetically modifying male moths so that when they mate all female offspring die. Continued releases of GM male moths would greatly depress the entire population of the insect pest. Insecticide resistance shouldn't be an issue because the GM moths are susceptible to insecticides.
- Research published in the professional journal *Circulation* concluded that people who consume the most dairy fat (whole milk, cheese, ice cream, etc.) have a 50% lower risk of developing diabetes. Let's have a shout-out for Ben & Jerry's!

— E.T.

MINER MILK LAB – FREQUENTLY ASKED QUESTIONS

What does the milk lab do? Our lab tests bulk tank, pen, and individual cow milk with a mid-infrared (MIR) milk analyzer. Most of our samples are from research studies. However, we do test milk samples from other sources. Since the summer of 2017, we have analyzed milk samples from around the US and Canada. We report milk fatty acid metrics along with other major milk components. The milk analysis information is helping nutritionists and farmers make better management decisions at the herd and pen level.

What type of instrument does the milk lab use for milk analysis? Our lab has a Delta Instrument CombiScope FTIR 300 HP that uses a Fourier Transform Infrared Rotation (FTIR) scanning mechanism. The CombiScope is essential two machines in one. It has a Lactoscope for determining the chemical composition of milk and Somascope for counting somatic cells in milk.

How do I contact the milk lab to get milk samples analyzed? The best way to reach us is by email at milklab@whminer.com or dann@whminer.com. We will send you a submission form, a supplies request form, and instructions for milk sampling.

How much does it cost to have samples analyzed at the milk lab? The cost for analysis is $10 per shipment received at the milk lab plus $2.75 for each sample within that shipment.

How do I collect milk for analysis? The most important thing is to collect milk samples from well mixed milk. Milk can be sampled from a bulk tank, in-line sampler, or individual cow milk sampler. After collection, it is best to add a preservative (e.g. Microtabs II) to the milk sample to prevent bacteria and mold growth. The milk sample should be stored in a refrigerator until shipment to our lab. Samples are best if shipped to us when they are 7 days or less old.

How do I ship samples to you? Milk samples should be send to: Miner Institute Milk Laboratory, 586 Ridge Rd., Chazy, NY 12921. The samples need to be kept cold (~34 to 40°F) during shipment to us. Shipping the samples in an insulated cooler with ice packs or frozen water bottles works well. Placing the milk samples in a plastic bag within the cooler is a good idea to prevent any milk from leaking out of the cooler during shipment. Many people ship for overnight/next day delivery. Some people in the northeast are reducing shipping cost by shipping 2 day or ground. Additional ice packs are needed to keep the samples cold with longer shipping times.

Can I send frozen milk? No. Slow freezing milk with a freezer will make the milk chunky. It will not work for MIR analysis. Frozen milk can be analyzed for fatty acids by gas chromatography at other labs.

Do you provide sampling supplies? Yes, we can provide you with sampling supplies or information on where to source supplies. We request that you fill out our supply request form and send that request to milklab@whminer.com or dann@whminer.com. Supplies that we offer are: a 2 oz sample vial with preservative, a 12-vial sampling kit that includes a 11"x9"x12" cooler, vials with preservative and 8 gel packs, and a 24-vial kit that includes a 13"x11"x12" cooler, vials with preservative, and 10 gel packs.

What information will I get from the milk analysis? We will report the results of your milk sample analysis in an excel formation with the following information:

- Traditionally measured milk components: fat B, %; fat, D %; anhydrous lactose, %; true protein, %; total solids, %; solids non fat, %; MUN, mg/dL; somatic cell count, cells/mL
- Milk fatty acids metrics: de novo, mixed, and preformed fatty acids expresses as g/100 g of milk and g/100 g of fatty acids; unsaturation index, double bonds/fatty acid
- Milk component yields: yield of traditionally measured milk components and milk fatty acid groups will be reported in g/d when milk yield (lb/cow/d) is provided when a sample is submitted.

Are other labs analyzing milk for the fatty acid metrics that are related to herd management? Yes. Labs that have Delta Instrument MIR milk analyzers can provide the milk fatty acid metrics. The prediction models for de novo, mixed origin, and preformed fatty acids and fatty acid unsaturation index were developed by Dr. Barbano (Cornell) and Delta Instruments. The prediction models are not patented but they are

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MILK LAB FAQs, Continued

proprietary to Delta Instruments. Other companies (e.g. Foss and Bentley) are free to develop their own versions of these models, but it is not easy. Different models and different infrared equipment measuring the same milk parameter may have differences in performance. Performance metrics of the models will be important. Dr. Barbano's lab continues to test bovine bulk tank and individual cow milk samples while developing new models for milk analysis. His lab tests milk from goats and sheep too.

The St. Albans Cooperative, the AgriMark Cooperative, and the Cayuga Marketing Cooperative are using the fatty acid group models for bulk tank bovine milk analysis simultaneously with payment testing for individual farms. The Sterns County and Zumbrota DHIA laboratories in Minnesota are providing the milk fatty acid metrics to people that submit samples. Cumberland Valley Analytical Services analyzes milk for the fatty acid groups and individual fatty acids by gas chromatography.

What are milk fatty acid metrics? The de novo fatty acids (<C16) and a portion of the mixed origin fatty acids (C16) are made in the cow's udder using the end products of rumen fermentation of carbohydrates. The other portion of the mixed origin fatty acids come from fat in the feed consumed. Preformed fatty acids (>C16) come from fat in the feed consumed and the mobilization of body fat, especially in early lactation. Milk fatty acid unsaturation index is the mean double bonds per fatty acid. Field experience and research have demonstrated that diets and management practices that increase de novo and/or mixed origin fatty acids result frequently in increased milk fat and protein. Typically, de novo fatty acids increase in response to improved rumen function or feed quality. Poor rumen health because of subacute ruminal acidosis (SARA) from diets containing too little physically effective fiber or too much fermentable carbohydrate, diets containing too much fat or specific fatty acids (RUFAL) that affect rumen biohydrogenation, poor bunk management that alters feeding behavior, and overstocking that affects time budgets can decrease de novo fatty acids in milk.

How are milk fatty acid metrics being used in the field? Typically, the goal is to use milk fatty acid metrics to make decisions on-farm to increase milk fat and protein yield. Farmers and their consultants that receive milk fatty acid metrics regularly look for trends over time. The data can indicate rather quickly that an unexpected change occurred or indicate the response to a planned change. Another approach is to do a herd "snapshot" and use the milk fatty acid metrics for troubleshooting. This is a common approach for herds where milk fat depression is occurring. Seasonal effects on milk composition as well as herd demographics (breed, days in milk, parity groups, etc.) need to be considered when evaluating milk fatty acid metrics.

— Heather Dann
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2018 Vermont Dairy Producers Conference
February 27, 2018
DoubleTree by Hilton Hotel Burlington, VT
(formerly the Sheraton located at 870 Williston Rd, South Burlington)
8 am to 4 pm

AGENDA:
8:00-8:25: Registration
8:25-8:30: Welcome-John Clark
8:30-9:20: Dr. Katy Proudfoot, *Re-thinking the maternity pen with the cow's natural behavior in mind*
9:20-9:30: Remarks by Secretary of Agriculture Anson Tebbetts
9:30-10:20: Jack Rodenburg, *Success Factors for Robotic Milking*
10:20-10:50: Break
10:50-11:40: Mike Lormore, *Financial Stability & Dairy Markets*
11:40-12:40: Lunch
12:40-12:45: Sponsor recognition and Announcements
12:45-1:30: Mack Dryden, *Laugh to the Top: A Hilarious Guide to Achieving Your Goals*
1:30-1:40: Remarks by Governor Phil Scott
1:35-2:25: Dr. Dave Barbano, *New milk analysis tools to improve fat and protein yields*
2:25-2:55: Break
2:55-3:45: Dr. Nigel Cook, *Lifestep: Taking a life cycle approach to preventing lameness on the dairy farm*
3:45-4:00: Door Prizes and Adjourn

Register at https://vermontdairyproducers.com/
https://www.facebook.com/VermontDairy/

The William H. Miner Agricultural Research Institute
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Closing Comment

Don't worry if it doesn't work right. If everything did you may be out of a job.

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